CLIMATE CHANGE ACTION PLAN

[Progress report — October 2000]

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1 EXECUTIVE SUMMARY

SaskPower's 1999 Climate Change Action Plan Progress Report summarizes the results of our activities and initiatives in reducing greenhouse gas (GHG) emissions this past year. Since our 1998/99 Climate Change Action Plan Update, we have made some revisions to our Voluntary Challenge and Registry (VCR) Inc. reporting. These changes will make our reporting more detailed and precise. In the 1999 report, we have developed a new climate change goal for 2005, and expanded the scope of our reporting to include emissions generated by buildings and vehicles used in our operations.

Assuming that SaskPower must reduce GHG emissions to 6% below 1990 levels by the 2008-2012 period as a result of Canada's commitment to the Kyoto Protocol, our climate change goal is to achieve 30% of our Kyoto gap by 2005. This would result in a carbon dioxide (CO_2) reduction of 2 million tonnes by 2005, well on our way to our projected reduction of 7 million tonnes annually as required during the first Kyoto commitment period, 2008-2012. As the demand for generation continues to increase, we will have to work hard to achieve increased GHG reductions.

To help achieve our climate change goal, SaskPower is actively involved with organizations that will help us develop policies, reduce emissions and research offset opportunities for the future. Organizations that we are currently involved with include the Canadian Electricity Association (CEA), the Greenhouse Gas Emission Reduction Trading (GERT) pilot, and the Greenhouse Emissions Management Consortium (GEMCo). It is involvement with organizations such as these that will allow SaskPower to build on our commitment in the years ahead.

SaskPower's 1999 GHG emissions totaled 14,654,100 tonnes of CO_2 equivalent (CO_2e). This is a 1.1% decrease from the 1998 total of 14,821,400 tonnes of CO_2e. We remain below our 1990 greenhouse gas intensity of 1.19 kg/kW.h from fossil fuel generation, reporting 1.17/kW.h in 1999. Our 1999 GHG emissions consisted of 97.6% CO_2, 2.3% nitrous oxide (N_2O), and small amounts of methane (CH_4). These percentages have remained relatively constant since 1990.

Some of the actions that SaskPower has taken in the past year to reduce GHG emissions and promote climate change issues include:

- becoming a champion-level sponsor of the Action By Canadians (ABC) Program;
- exploring new offset opportunities through GEMCo and other avenues;
- improving the efficiency of our thermal generation and hydroelectric generation stations.

Actions such as these help SaskPower find new ways to reduce our GHG emissions, and maintain our commitment to protect the environment while providing our customers with safe, reliable and cost-effective sources of electricity. We remain focused on achieving GHG reductions that will allow us to reach our new climate change goal.

2 ORGANIZATION PROFILE

SaskPower was created as the Saskatchewan Power Commission (SPC) in 1929 with the mandate to deliver safe, reliable and cost-effective power to the residents of Saskatchewan. SaskPower was incorporated as a provincial Crown corporation in 1950, and is governed by the Power Corporation Act of Saskatchewan.

SaskPower operates a network of 14 generating stations and over 150,000 kilometres of transmission and distribution lines. We serve more than 428,000 customers over 526,600 square kilometres of diverse terrain. With a net generating capacity of 2,889 megawatts (MW), we provide electricity from three coal-fired thermal stations, one natural gas-fired thermal station, seven hydroelectric stations, and three gas turbine plants located around the province.

SaskPower is committed to operating in a manner that helps protect the environment today and for future generations. To act on this commitment, SaskPower provides sound planning and training to ensure that we meet environmental laws and regulations, and that our employees are aware of these laws and regulations. To help minimize the impact of our operations on the environment, SaskPower is involved in a range of initiatives, such as implementing an ISO 14001-compliant environmental management system, installing electrostatic precipitators at Boundary Dam Power Station, introducing a wetlands education project in partnership with Ducks Unlimited Canada, and growing and distributing tree seedlings through our Shand Greenhouse.

3 SENIOR MANAGEMENT SUPPORT

3.1 SIGNED STATEMENT OF ENDORSEMENT

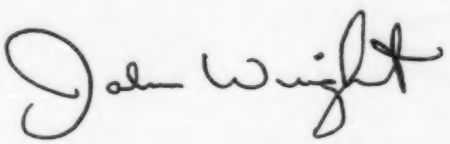
On behalf of SaskPower, I am pleased to submit our 1999 progress report to the Voluntary Challenge and Registry (VCR) Inc.

This report, our sixth since 1995, reflects SaskPower's ongoing commitment to the principles and objectives of the VCR program as we work to balance Saskatchewan's energy needs with a sustainable environment.

In keeping with our proactive approach to the climate change issue, SaskPower set a new goal this year — to achieve 30% of our Kyoto gap by 2005. This goal aligns SaskPower with Canada's commitment to the Kyoto Protocol and will result in a CO_2 reduction of 2 million tonnes by 2005.

The following report details our progress toward that goal as we reduced or offset over 528,000 tonnes of GHG emissions in 1999. We have undertaken a broad base of activities, both internally and with our business and community partners, in support of our commitment to voluntary action, and we work to achieve the highest standards of reporting to ensure that our results are accurate and verifiable.

Climate change is a complex, challenging issue — for our industry, our nation and the global community. At SaskPower, we remain committed to taking a lead role in developing solutions that will benefit the generations to come.



John Wright

PRESIDENT & CEO

SASKPOWER

OCTOBER 27, 2000

3.2 INTERNAL PRACTICES AND MANAGEMENT SYSTEMS DEALING WITH CLIMATE CHANGE

The United Nations has declared climate change as a serious issue with a wide range of impacts. SaskPower recognizes the magnitude of this issue for the environment and our business operations, which is why we are undertaking actions that will help reduce emissions and also educate employees and the public about climate change issues. We are looking to the future for new energy-efficiency and GHG-offset projects to decrease our emissions and discover additional reductions.

SaskPower has successfully implemented an ISO 14001-compliant environmental management system (EMS) throughout the corporation. The EMS allows SaskPower to better control the environmental aspects of our business, while ensuring that we comply with all applicable environmental laws and regulations. In 1999, Boundary Dam Power Station became the first area of SaskPower to be registered to the ISO 14001 standard. All other areas of the corporation achieved registration to the standard in 2000.

Regular reporting to senior management is another method of ensuring that SaskPower is making progress toward our climate change goal. Results are reviewed to ensure we are on target to reach our goal and to see if any changes or improvements can be made that will allow us to achieve better results in the future. An internal climate change committee meets regularly to coordinate climate change efforts and activities between departments, discuss issues, and communicate strategies for SaskPower's direction on climate change. This committee involves employees from three areas within SaskPower: Power Production, Customer Services and Environmental Programs.

4 BASE YEAR QUANTIFICATION

4.1 METHODOLOGY

SaskPower's GHG emissions consist of 97.6% CO_2, 2.3% N_2O and small amounts of CH_4. Since it is the primary GHG in the electrical industry, CO_2 is used as the standard unit of measurement for emissions. GHG are converted to a CO_2 equivalent (CO_2e) using the following global warming potentials: $CO_2 = 1$, $CH_4 = 21$ and $N_2O = 310$.

We have chosen to use 1990 as our baseline year for emissions reporting purposes. Baseline emissions totals may be adjusted in cases where the baseline year was not representative of typical company operations. This was the case for SaskPower in 1990, when the baseline was adjusted to account for favorable hydro conditions that resulted in less thermal production, which, in turn, created fewer emissions. In 1999, our adjusted baseline total was 10.6 million tonnes of CO_2e.

SaskPower calculates its CO_2 emissions from thermal generating stations based on the amount of fuel used in generation. All emissions factors used to perform calculations and estimates for buildings and vehicles are provided by the 1999 VCR Inc. Registration Guide. CO_2 emissions from generation can vary, depending on the properties of the fuel burned. Therefore, SaskPower's CO_2 emissions are calculated on an individual plant basis, multiplying the amount of fuel used at the plant by the estimated amount of carbon contained in the fuel. The total carbon produced is then converted into an equivalent amount of CO_2.

The CH_4 and N_2O emissions are calculated in a similar manner, by multiplying the amount of fuel burned by an emissions factor. The factor used will depend on what type of fuel is burned in the plant.

New this year to SaskPower's VCR Inc. reporting is the addition of emissions produced by vehicles and buildings used in our operations. Emissions from vehicles are calculated by multiplying the total litres of fuel (gasoline, diesel, propane) consumed in a given year by the appropriate emissions factor for the type of fuel used. Emissions resulting from electricity consumption are not included in the emissions from buildings as they are included in the generation emissions. GHG emissions due to natural gas consumption in SaskPower buildings were calculated by multiplying the amount of gas consumed by the appropriate fossil fuel emissions factor.

Emissions due to line losses in our transmission and distribution network are included in generation emissions and are not treated as a separate entry in the tables. SaskPower is also reporting emissions from the injection of CO_2 into the cooling water at Boundary Dam Power Station. This program began in July 1991, with detailed record-keeping beginning in 1992. Records are complete to 1998, with the exception of 1994, where an estimate was used for the consumption figure.

4.2 QUANTIFICATION

See page 19.

5 PROJECTION

5.1 METHODOLOGY

Emissions forecasts for 2000 through 2005 were performed using the following methods:

- Plant emissions were calculated in the same manner as prior years, but using estimated fuel consumption instead of actual consumption.
- Vehicle emissions were calculated in the same manner as prior years. Annual fuel consumption is projected to increase by a small percentage.
- Power and natural gas consumption in SaskPower buildings is calculated in the same manner as prior years and is expected to increase slightly.

5.2 QUANTIFICATION

This report contains new GHG emissions projections through the year 2005. Conservative estimates have been used in the calculations of future projections to ensure that they are as accurate as possible. The major sources of GHG emissions in SaskPower's operations result from our three coal-fired power stations, three gas turbine plants, and one natural gas-fired thermal station. Indirect sources of emissions for SaskPower include emissions from our fleet vehicles and buildings located throughout the province. Our emissions are composed of the three major GHG's: CO_2, CH_4 and N_2O.

6. TARGET SETTING

6.1 TARGETS

By developing a new GHG emissions reduction target, SaskPower has demonstrated our commitment to target setting. This new target will allow SaskPower to monitor progress in reducing emissions and assess any further actions that may be necessary to reach the target. Assuming the existence of credit for early action, SaskPower's goal is to achieve 30% of our Kyoto gap by 2005. Our Kyoto target is to reduce net GHG emissions to 6% below 1990 levels by the 2008-2012 time period. This translates into a target reduction of 2 million tonnes by 2005.

6.2 PROCESS FOR TARGET REVIEW AND UPDATE

This target is determined in consultation with Power Production's Sustainable Development staff and approved by the SaskPower President. Progress towards meeting our target is also updated in reports to management.

7. MEASURES TO ACHIEVE TARGETS

7.1 LIST OF KEY ACTIVITIES/PROJECTS

SaskPower is currently involved with several internal and consumer projects that will generate reductions to reach our climate change goal. We are also exploring new opportunities for reductions in all areas of the corporation. Projects that SaskPower is not currently involved in are also mentioned due to our past participation and support of these projects. Some projects are listed simply for informational purposes, and do not result in any verifiable GHG reductions for SaskPower. Selected projects are discussed in the following section.

CONSUMER INITIATIVES:

Past projects

- **Watson and Canora Energy Use Program**

In partnership with other organizations, SaskPower tested various energy management concepts in the town of Watson and the district of Canora. The energy reduction measures consisted of water heater add-ons, residential light retrofits and the use of timers to efficiently operate vehicle block heaters. The program resulted in energy savings of 58,000 kW.h per year.

CO_2 reduction: 50 tonnes/year since 1993

- **Saskatchewan Building Energy Management Program**

The Building Energy Management Program began in 1996 with start-up funds provided by SaskPower and SaskEnergy. The program involves auditing for possible energy and natural gas savings. Although SaskPower is no longer an active participant, the program continues to exist as a service of the Saskatchewan Research Council (SRC). The SRC operates and promotes the program throughout Saskatchewan.

- **Ice Rink Energy Management Program**

The Ice Rink Energy Management Program was initiated in 1995 with the intention of assisting municipal ice rinks with their operating costs by way of reducing energy consumption. SaskPower no longer participates in the program, but 163 rinks were audited during the period of our involvement, resulting in identifying potential energy savings of over 1.7 million kW.h.

- **Health Care Energy Management**

In 1994, SaskPower partnered with Natural Resources Canada, SaskEnergy, Saskatchewan Energy and Mines, and Saskatchewan Health to create a pilot project to identify potential energy savings in facilities in two Saskatchewan health districts. The project involved installation of energy-saving devices in the facilities and training of health-care staff in energy management.

- **Energy Audits**

Between 1990 and 1994, SaskPower offered an energy audit program to help industrial and commercial customers find potential energy savings in their operations. This program resulted in savings of approximately 29 million kW.h of energy and CO_2 reductions of 23,200 tonnes/year.

Current projects

- **SaskPower Energy Solutions**

In 1999, SaskPower Energy Solutions was created to help customers reduce energy consumption and costs. This is a demand-side management program with two main products: the Energy Performance Contracting (EPC) Solution and the Transformer Maintenance Solution. SaskPower has entered into an alliance with Honeywell Ltd. to offer EPC. These services are currently being offered to large commercial, industrial and institutional customers. Additional services may be offered to all customers in the future.

INTERNAL INITIATIVES:

Transmission and Distribution

- **Condie/Queen Elizabeth Transmission Line**

The Condie/QE transmission line is a 230-kV line linking the Condie switching station near Regina and the Queen Elizabeth Power Station in Saskatoon. Completed in 1997, this line was designed to improve transmission reliability and efficiency between power stations in southern Saskatchewan and load areas in the north. As a result of this transmission line, SaskPower will save an estimated 120 million kW.h of electricity in 1999 due to reduced line losses.

CO_2 reduction: 105,600 tonnes in 1999

Generation projects

SaskPower is undertaking a number of generation initiatives to improve performance from our generating units. Projects listed are considered changes to the original design or operation of the unit, and not as regular maintenance.

- **Boundary Dam Boiler/Turbine Optimization**

There are a number of initiatives underway to improve the quality of operation of the Boundary Dam boilers and turbines. The actions will improve the efficiency of the units through the reduction of slagging and fouling, reduction in soot-blowing losses, and improved boiler and turbine cycle efficiency. These initiatives include fuel quality management, improved soot-blowing strategies, fuel and air distribution system tuning, on-line performance displays and off-line boiler/economizer cleaning.

CO_2 reduction: 12,600 tonnes in 1999

- **Boundary Dam Induced Draft Fans**

The installation of electrostatic precipitators on Boundary Dam Units 1, 2, 3, 4 and 5, allows the use of more efficient airfoil induced draft fans, and results in a considerable reduction in fan power consumption. Airfoil induced draft fans were installed on Unit 4 in 1999 and Unit 3 in 2000, at the same time as precipitators were installed on these units. Similar fans will be installed on Unit 5 in 2002, Unit 1 in 2002 and Unit 2 in 2003.

CO_2 reduction: 1,400 tonnes in 1999

- **Poplar River Unit 1 Precipitator Controls**

Improvements to the precipitator controls for Poplar River Unit 1 will reduce power consumption by an estimated 0.5 MW. This project is to be completed in 2000.

CO_2 reduction: 4,100 tonnes/year starting in 2000

- **Poplar River Unit 2 Boiler Upgrade**

Major boiler upgrade work on the turbine of Poplar River Unit 2 is currently underway. This work includes improved air heater seals, improved economizer performance, mill tuning and burner retrofits.

CO_2 reduction: 19,200 tonnes/year once work is completed in 2000

- **Repowering of Queen Elizabeth Power Station Unit 1**

Six gas turbines are being installed at the Queen Elizabeth Power Station in Saskatoon. The gas turbines are rated to produce 25 MW each and the exhaust from these turbines will pass through heat-recovery steam generators, which will supply the steam to the Unit 1 steam turbine.

CO_2 reduction: 34,900 tonnes/year starting in 2002

- **Landis Efficiency and Capacity Improvements**

The Landis gas turbine was upgraded in 1999 to increase both capacity and efficiency.

CO_2 reduction: 1,700 tonnes in 1999

- **Island Falls Units 1, 2 and 3 Runner and Transformer Upgrades**

The capacity increases resulting from runner and transformer upgrades will reduce water spillage and increase generation from these units, which will then replace thermal generation.

CO_2 reduction: 6,400 tonnes/year

- **Condenser Cleanliness at Coal-Fired Generating Stations**

The efficiency of the turbine steam cycle relies on proper cooling of the condenser, and proper cooling depends on clean heat transfer surfaces. A number of initiatives have been undertaken to improve condenser cleanliness, including condenser performance monitoring, chemical cleaning procedures, ball cleaning systems and CO_2 injection for scaling control on certain units.

CO_2 reduction: 72,500 tonnes in 1999

Other projects

- **Zero Garbage (Zero G) Recycling Program**

SaskPower has operated its Zero G program since 1993, incorporating offices, generating stations, and transmission and distribution facilities throughout Saskatchewan. Regular waste audits are conducted to measure the volume and types of materials recycled in this program, and to track recycling patterns in our facilities. At our head office in Regina, approximately 50,000 tonnes of paper was recycled through this program in 1999. The Zero G program decreases the amount of waste sent to landfills throughout the province, thereby reducing landfill gases, reducing energy use in paper production, and reducing the need for additional tree harvesting for paper production.

CO_2 reduction: 200 tonnes in 1999

- **Head Office Building Upgrade**

During 1996 and 1997, the exterior of SaskPower's head office in Regina underwent a number of energy-saving improvements. This project will save on natural gas consumption and costs.

CO_2 reduction: 150 tonnes/year

7.2 ESTIMATED IMPACT OF ACTIVITIES/PROJECTS

The following table lists the estimated annual impact of SaskPower projects that result in GHG reductions for 2000 through 2005. These projects are an important part of our GHG reduction strategy and help improve efficiency and energy consumption for our customers, while creating CO_2 reductions for the environment.

ESTIMATED GHG IMPACT 2000-2005 (tonnes)

REDUCTION PROJECT	2000	2001	2002	2003	2004	2005
Consumer Initiatives:						
Watson/Canora	50	50	50	50	50	50
Internal Initiatives:						
T&D PROJECTS						
Condie/QE Transmission Line	105,600	105,600	105,600	52,800	52,800	52,800
Green Lake/Beauval Transmission Line	15,100	15,100	15,100	15,100	15,100	15,100
Lloydminster/Ermine Transmission Line	6,500	6,500	6,500	15,100	15,100	15,100
Prince Albert/La Ronge Transmission Line	—	5,400	10,800	10,800	10,800	10,800
Rural Lines	3,500	3,500	3,500	3,500	3,500	3,500
GENERATION PROJECTS	367,300	376,100	415,300	423,100	425,800	425,800
OTHER PROJECTS						
Head Office Recycling	200	250	250	300	300	350
Head Office Upgrade	150	150	150	150	150	150
Offsets						
OFFSET PROJECTS	356,665	360,165	361,965	2,567,965	2,570,065	2,621,365
Total Reductions:	**855,065**	**872,815**	**919,215**	**3,088,865**	**3,093,665**	**3,145,015**

8 RESULTS ACHIEVED

8.1 ~CURRENT REPORTING YEAR

SaskPower's 1999 GHG reductions totaled 528,400 tonnes of CO_2e. This is a good first step to achieving our reduction goal of 2 million tonnes annually by 2005. The use of offsets is a very important part of SaskPower's mitigation strategy, but we must also discover further reductions in customer efficiencies and internal actions, including generation efficiency improvements. A detailed list of GHG reductions can be found on page 18, and GHG emissions are listed on page 19.

1999 GHG EMISSION REDUCTIONS AND OFFSETS (tonnes)

REDUCTION PROJECT	1999
Consumer Initiatives:	
Watson/Canora	50
Internal Initiatives:	
T&D PROJECTS	
Condie/QE Transmission Line	105,600
Green Lake/Beauval Transmission Line	15,100
Lloydminster/Ermine Transmission Line	6,500
Rural Lines	3,500
GENERATION PROJECTS	324,400
OTHER PROJECTS	
Head Office Recycling	200
Head Office Upgrade	150
Offsets:	
OFFSET PROJECTS	72,900
Total Reductions:	**528,400**

8.2 INTERIM YEARS

For GHG reductions and emissions from 1990 through 1998, see tables 10.2 and 10.3.

8.3 VERIFICATION

SaskPower currently has no external third-party verification process in place for our GHG reporting. However, any data used in performing current and past calculations is maintained on file for internal documentation and verification. Verification procedures used include verifying calculations and figures used in calculations and confirmation of project information for use in this report.

8.4 OFFSETS

Offsets are a significant part of our climate change mitigation strategy. An offset project removes or sequesters GHG outside the normal operations of SaskPower and our facilities. During 1999, SaskPower continued working toward finding and acquiring new carbon-offset opportunities. Offsets may consist of emission reductions, emissions avoidance and carbon sequestration activities. Specific examples of offsets include:

- the preservation and enhancement of carbon stocks such as forests, wetlands and soils that may be in danger of disappearing;
- long-term disposal of GHG through geological sequestration;
- the control or capture of pollution, including the capture and sale of flyash;
- offsetting fossil fuel consumption through the use of low-emissions technology.

Assuming the approval of credit for early action in Canada, SaskPower's goal is to fill 30% of our Kyoto gap by 2005. For now, it is understood that our Kyoto target will be to reduce to 6% below 1990 levels.

Research and development is also a vital part of SaskPower's offset strategy. This is why SaskPower supports research and development projects that may produce offset projects for the future through participation in organizations such as GEMCo and GERT. SaskPower has also provided funding for the International Centre for Carbon Dioxide Capture at the University of Regina. This facility will develop new technologies to reduce CO_2 emissions, perform research for new storage and disposal methods, and discover new industrial uses for CO_2 gas. Other projects that we are currently exploring include clean coal technologies and distributed generation opportunities.

Two additional research and development opportunities supported by SaskPower include the Prairie Soil Carbon Balance (PSCB) project in which we were a major contributor through GEMCo, and ongoing studies at the Canadian Agricultural Energy End-Use Data and Analysis Centre (CAEEDAC) at the University of Saskatchewan. The PSCB project is investigating the science of measuring, monitoring and verifying carbon sequestration in agricultural soil. Sustainable agricultural practices, such as minimal tillage and zero-tillage, lead to increases in soil carbon sequestration potential. CAEEDAC is currently studying renewable energy options and the possibility of increasing the carbon sequestration potential of mined land that SaskPower has reclaimed.

- **Flyash Sales**

SaskPower International markets the flyash produced by our Boundary Dam and Shand Power Stations to a variety of markets. Flyash is a fine powder by-product of burned coal that can be extracted from exhaust gases, preventing release into the atmosphere. Flyash properties vary between power stations due to the composition of coal burned at each plant. As a cement extender, flyash can be used to make concrete blocks and pipes and ready-mix concrete. It is also used as a fill material in the mining and oil industries. In 1999, SaskPower sold 45,710 tonnes of flyash, and sales are projected to increase to over 71,000 tonnes by 2005.

CO_2 offset: 22,900 tonnes in 1999

- **Meridian Cogeneration Project**

December 1999 marked the beginning of power production at the Meridian Cogeneration Plant in Lloydminster. Cogeneration is the simultaneous production of electricity and steam from a single fuel source. The plant uses two gas turbines burning natural gas to generate electricity. Waste heat from the gas turbines creates steam that drives a single steam turbine to generate additional power. Natural gas is a relatively clean-burning fossil fuel that allows SaskPower to avoid producing thousands of tonnes of CO_2 emissions by displacing coal-fired generation.

CO_2 offset: 280,000 tonnes/year starting in 2000

- **Old Man on His Back Short Grass Prairie and Heritage Preserve**

In 1996, SaskPower entered into a partnership with the Nature Conservancy of Canada to create a 13,100-acre prairie and heritage preserve. This preserve is one of the last short-grass prairie communities in the prairie provinces, and is home to a number of endangered species including the ferruginous hawk, burrowing owl, loggerhead shrike and swift fox. The property also has significant heritage value because of cultural resources in the form of medicine wheels and pastures used by the North West Mounted Police. Grasslands and forests that are kept in a natural state capture carbon from the atmosphere and sequester it in the soil. This project will offset 500,000 tonnes of CO_2 over a 10-year period, beginning in 1996.

CO_2 offset: 50,000 tonnes/year ending in 2005

- **SERM Agreement**

November 1999 marked the beginning of a new agreement between SaskPower and Saskatchewan Environment and Resource Management (SERM) that will result in emission reduction credits and environmental benefits by protecting existing carbon reserves and restocking an area classified as "Not-Sufficiently Restocked." Under the agreement, SERM will plant between four and five million seedlings over the next four years and protect existing forest carbon reserves. These reserves will sequester carbon from the atmosphere, allowing SaskPower to receive carbon offset credits from the agreement. As a result of this agreement, SaskPower is entitled to 22,000,000 tonnes of CO_2e offsets.

CO_2 offset: 2,200,000 tonnes/year from 2003 to 2012

- **Ducks Unlimited**

January 1997 marked the beginning of a partnership between SaskPower and Ducks Unlimited Canada that will benefit wildlife habitat projects in Saskatchewan. SaskPower became a Diamond Legacy sponsor of Ducks Unlimited by establishing a $1 million, 30-year trust fund that guarantees a minimum annual income of $100,000 for conservation projects. Projects that were funded in 1999 include the following:

- **Wildlife flushing devices** – a bar is installed on hay mowers to flush wildlife out of the way before the mower arrives;
- **In-school education** – provides instructors who teach students about the contribution that wetlands make to the environment;
- **Native Plants and Ecovar™ Development Program** – provides commercially available native seeds for re-vegetation of rights-of-way and disturbed sites;
- **Birch River Dam repairs** – include reconstruction of a damaged wall and stabilization of another wall to ensure the long-term operation of the structure.

SaskPower and Ducks Unlimited are also working together on research pertaining to carbon sequestration in wetlands.

- **SaskPower Shand Greenhouse**

SaskPower Shand Greenhouse has been in operation since 1991, producing seedlings for distribution throughout Saskatchewan. The greenhouse draws excess heat from the cooling towers of Shand Power Station to provide warmth during the winter for the propagation of trees, shrubs, and native plant species. In 1999, with the help of TREEmendous Saskatchewan and other partners, the greenhouse distributed over 340,000 tree seedlings to organizations and individuals within the province. This is an important project for SaskPower because trees sequester increasing amounts of carbon as they age, creating CO_2 emission reductions.

- **Other Offsets**

SaskPower currently has several offset projects under development. Given the uncertainty surrounding ratification of Kyoto and credit for early action, SaskPower is focusing on projects that have benefits other than GHG offsets. Ancillary benefits may include additional environmental benefits or may involve other aspects of SaskPower's operations, such as distributed generation and use of renewable fuel sources. SaskPower is currently developing other projects that will allow us to reduce our net GHG emissions and contribute to environmental sustainability.

GEMCO PROJECTS

- **Iowa Farm Project**

As a member of GEMCo, SaskPower was involved in the purchase of CO_2 offset credits from Iowa farmers through an agreement with IGF Insurance Company. IGF will solicit CO_2 certified emission reduction credits (CERCs) from farmers through its network of crop insurance agents. CERCs are produced through GHG reductions from an established baseline. Through the GEMCo agreement, SaskPower is entitled to a total of 40,000 tonnes of CO_2 offsets by 2012. The project involves having farmers adopt sustainable agricultural

practices such as minimal tillage and zero-tillage, as well as new animal waste management practices, which will increase carbon sequestration and direct emission reductions.

CO_2 offset: 4,000 tonnes/year from 2003 to 2012

- **Norseman Landfill Gas Project**

Another GEMCo project that SaskPower is involved with is the Norseman Landfill Gas project. As a result of this project, SaskPower now has access to 23,310 tonnes of CO_2 emission reduction credits over a 14-year period, beginning in 2000. CH_4 is collected from the Port Mann Landfill in Surrey, B.C. and delivered to a nearby wallboard plant by a pipeline six kilometres in length. At the plant, the landfill gas is mixed with regular natural gas to heat the burners that cure the wallboard. This process prevents the release of CH_4 into the atmosphere and reduces the plant's need for natural gas.

CO_2 offset: 1,665 tonnes/year from 2000 to 2013

- **Future GEMCo Projects**

Through future GEMCo projects, SaskPower hopes to accumulate a stream of offsets from various sources, all of which will pave the way for more significant offset purchases in the future. We anticipate that CO_2 offsets from these projects could be as high as 50,000 tonnes per year, starting in 2005.

9 EDUCATION, TRAINING AND AWARENESS

9.1 OUR CORPORATE RESPONSE TO THE CLIMATE CHANGE ISSUE

Climate change is a very important subject for SaskPower and for all Canadians. The Kyoto Protocol will have a notable effect on SaskPower, one of the largest fossil-fuel based electricity producers in Canada. In order to minimize the impact of the Kyoto Protocol, we are undertaking voluntary actions to reduce GHG emissions throughout our operations and we are working hard to discover additional areas for achieving reductions. We are also currently exploring new offset opportunities that will help us meet future reduction targets.

9.2 CLIMATE CHANGE AND OUR EMPLOYEES

Since climate change affects SaskPower's business and the environment, it is important that our employees are informed about this issue. Employees are also informed on what actions SaskPower is performing to reduce emissions and meet future targets. We address our employees on climate change issues by way of two employee publications, HiLines and On-Line. We report on some of the actions that SaskPower is undertaking to reduce GHG emissions and how the climate change issue will affect our business operations now and in the future. Employees also have access to annual documents such as the Annual Report, the Environment Review and the Climate Change Action Plan, which discuss climate change issues. Employees attended climate change workshops through the ABC program, where they learned how to reduce emissions at home, in their vehicles and in their communities.

9.3 CLIMATE CHANGE AND OUR EXTERNAL CONTACTS

SaskPower has been active in promoting climate change issues within Saskatchewan and the Canadian electrical industry. We have participated in voluntary emissions reporting since the inception of VCR Inc. in 1995. As a member of the CEA, SaskPower is involved with an external education and awareness program through the Environmental Commitment and Responsibility (ECR) program. The ECR program requires members to improve environmental performance and allows participation with federal and provincial governments in public policy development and implementation. Through our commitment to regular reporting, SaskPower believes that we set a good example for other organizations within Saskatchewan, and the electrical industry as well.

9.4 OUR PUBLIC EDUCATION ON CLIMATE CHANGE

SaskPower participates in public education on climate change issues in a variety of ways. Our involvement as a champion-level sponsor of the ABC program is one example of this public education as space was made available for the public to attend the same climate change workshops as SaskPower employees. In addition, the public receives climate change information from SaskPower news releases, our website and publications such as the Climate Change Action Plan, Annual Report and Environment Review.

10 CLIMATE CHANGE SUMMARY TABLES

10.1 GENERATION PROJECTS

10.2 GREENHOUSE GAS REDUCTIONS

10.3 GREENHOUSE GAS EMISSIONS

10.1 GENERATION PROJECTS (TONNES OF CO_2)

SaskPower

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Estimated 2000	2001	2002	2003	2004	2005
Boundary Dam																
ALL UNITS																
– BOILER/TURBINE OPTIMIZATION						2,500	5,000	7,600	10,100	12,600	15,100	17,600	20,200	22,700	25,200	25,200
UNIT 1																
– INDUCED DRAFT FAN													300	800	800	800
UNIT 2																
– INDUCED DRAFT FAN														600	800	800
UNIT 3																
– WATERLANCE ADDITION			4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600
– INDUCED DRAFT FAN											1,400	5,600	5,600	5,600	5,600	5,600
UNIT 4																
– WATERLANCE ADDITION			2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
– INDUCED DRAFT FAN										1,400	5,700	5,700	5,700	5,700	5,700	5,700
UNIT 5																
– ECONOMIZER REBUILD								1,900	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500
– INDUCED DRAFT FAN													1,400	5,600	5,600	5,600
Shand																
ECONOMIZER SURFACE AREA ADDITION						5,500	16,500	16,500	16,500	16,500	16,500	16,500	16,500	16,500	16,500	16,500
REPLACE ESTEVAN GENERATING STATION			90,800	181,600	181,600	181,600	181,600	181,600	181,600	181,600	181,600	181,600	181,600	181,600	181,600	181,600
Poplar River																
ALL UNITS																
– SOOTBLOWER COMPRESSOR CONTROLS												2,100	2,100	2,100	2,100	2,100
UNIT 1																
– PRECIPITATOR CONTROLS											4,100	4,100	4,100	4,100	4,100	4,100
UNIT 2																
– BOILER UPGRADE											19,200	19,200	19,200	19,200	19,200	19,200
Queen Elizabeth																
UNIT 1 – REPOWERING													34,900	34,900	34,900	34,900
Landis																
EFFICIENCY/CAPACITY IMPROVEMENTS										1,700	5,000	5,000	5,000	5,000	5,000	5,000
Island Falls																
UNIT 1 – RUNNER UPGRADE									6,400	6,400	6,400	6,400	6,400	6,400	6,400	6,400
UNIT 2 – RUNNER UPGRADE									6,400	6,400	6,400	6,400	6,400	6,400	6,400	6,400
UNIT 3 – RUNNER UPGRADE									6,400	6,400	6,400	6,400	6,400	6,400	6,400	6,400
Thermal Stations																
CONDENSER CLEANING		8,100	16,100	24,200	32,200	40,300	48,400	56,400	64,500	72,500	80,600	80,600	80,600	80,600	80,600	80,600
Total Generation Projects																
		8,100	114,300	213,200	221,200	237,300	258,900	271,400	310,800	324,400	367,300	376,100	415,300	423,100	425,800	425,800

10.2 GREENHOUSE GAS REDUCTIONS (TONNES OF CO_2)

SaskPower

Reductions	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Estimated 2000	2001	2002	2003	2004	2005
WATSON/CANORA				50	50	50	50	50	50	50	50	50	50	50	50	50
TRANSMISSION & DISTRIBUTION																
– CONDIE/QE								96,000	96,000	105,600	105,600	105,600	105,600	52,800	52,800	52,800
– GREEN LAKE/ BEAUVAL										15,100	15,100	15,100	15,100	15,100	15,100	15,100
– LLOYDMINSTER/ ERMINE										6,500	6,500	6,500	6,500	15,100	15,100	15,100
– PRINCE ALBERT/LA RONGE												5,400	10,800	10,800	10,800	10,800
– RURAL LINES						3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
GENERATION PROJECTS		8,100	114,300	213,200	221,200	237,300	258,900	271,400	310,800	324,400	367,300	376,100	415,300	423,100	425,800	425,800
HEAD OFFICE UPGRADE							150	150	150	150	150	150	150	150	150	150
RECYCLING				50	80	100	150	150	150	200	200	250	250	300	300	350
TOTAL REDUCTIONS	**0**	**8,100**	**114,300**	**213,300**	**221,330**	**240,950**	**262,750**	**371,250**	**410,650**	**455,500**	**498,400**	**512,650**	**557,250**	**520,900**	**523,600**	**523,650**
Offset Projects																
FLYASH SALES	10,000	9,750	9,600	8,750	13,500	16,500	18,000	31,500	31,800	22,900	25,000	28,500	30,300	32,300	34,400	35,700
MERIDIAN CO-GENERATION											280,000	280,000	280,000	280,000	280,000	280,000
PRAIRIE CONSERVATION							50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
SERM AGREEMENT														2,200,000	2,200,000	2,200,000
IOWA FARMS														4,000	4,000	4,000
NORSEMAN LANDFILL GAS											1,665	1,665	1,665	1,665	1,665	1,665
FUTURE GEMCO PROJECTS																50,000
TOTAL REDUCTIONS	**10,000**	**9,750**	**9,600**	**8,750**	**13,500**	**16,500**	**68,000**	**81,500**	**81,800**	**72,900**	**356,665**	**360,165**	**361,965**	**2,567,965**	**2,570,065**	**2,621,365**
Total Greenhouse Gas Reductions																
	10,000	**17,850**	**123,900**	**222,050**	**234,830**	**257,450**	**330,750**	**452,750**	**492,450**	**528,400**	**855,065**	**872,815**	**919,215**	**3,088,865**	**3,093,665**	**3,145,015**

10.3 GREENHOUSE GAS EMISSIONS

SaskPower

Carbon dioxide (CO_2) emissions in tonnes (t)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Estimated 2000	2001	2002	2003	2004	2005
BOUNDARY DAM	5,029,000	5,238,000	5,817,000	5,315,000	5,724,000	6,153,000	6,325,000	6,325,000	6,545,900	6,575,500	6,630,100	6,697,400	6,724,900	6,353,100	6,609,400	6,650,900
POPLAR RIVER	4,844,000	4,868,000	4,813,000	5,153,000	5,156,000	4,757,000	5,165,000	4,793,000	4,765,400	4,597,500	4,428,900	4,653,200	4,775,100	4,757,600	4,700,900	4,543,800
ESTEVAN	287,000	181,000	52,000													
SHAND			866,000	2,095,000	2,285,000	2,102,000	2,318,000	2,391,000	2,291,800	2,428,300	2,064,400	2,234,400	2,227,200	2,283,200	2,252,200	2,253,300
QUEEN ELIZABETH	143,000	150,000	352,000	216,000	341,000	359,000	168,000	493,000	612,700	569,200	386,000	435,300	533,800	687,300	704,100	913,800
MEADOW LAKE	10,400	30,200	64,600	27,800	27,600	55,000	42,500	56,700	141,000	84,500	52,600	15,500	6,000	2,100	1,900	30,200
LANDIS	20,300	6,700	21,500	15,100	17,700	26,500	24,400	63,800	97,800	39,600	88,800	35,400	16,000	16,800	28,500	107,500
SUCCESS	700	3,900	1,500	1,300	1,500	400	900	3,000	8,200	3,200	4,100	2,100	1,700	400	400	600
COOLING WATER CO_2 Injection – B.Dam			2,800	3,500	3,200	3,000	2,900	1,000	900							
FLEET VEHICLES	11,900	11,600	12,400	12,000	12,100	12,500	11,500	10,500	10,100	10,500	10,500	10,600	11,000	11,500	11,500	11,500
BUILDINGS	1,400	1,400	1,300	1,500	1,300	1,500	1,600	1,600	1,400	1,500	1,400	1,400	1,400	1,500	1,500	1,500
SUBTOTAL	**10,347,700**	**10,490,800**	**12,004,100**	**12,840,200**	**13,569,400**	**13,469,900**	**14,059,800**	**14,138,600**	**14,475,200**	**14,309,800**	**13,665,800**	**14,085,300**	**14,297,100**	**14,113,500**	**14,310,400**	**14,513,100**

Methane (CH_4) emissions in kilograms (kg)																
BOUNDARY DAM	68,900	71,800	79,800	72,900	78,500	84,400	86,700	86,800	90,100	90,400	91,200	92,100	92,500	87,400	90,900	91,500
POPLAR RIVER	76,500	76,900	76,000	81,400	81,400	75,100	81,500	75,700	75,200	72,600	69,900	73,500	75,400	75,100	74,200	71,700
ESTEVAN	3,900	2,500	700													
SHAND			11,700	28,700	31,400	28,900	31,800	33,000	31,500	33,400	28,400	30,700	30,600	31,400	31,000	31,000
QUEEN ELIZABETH	370	390	900	560	1,810	2,150	430	1,300	6,600	6,100	4,100	4,700	5,700	7,400	7,500	9,800
MEADOW LAKE	30	80	170	70	70	140	110	150	1,500	900	600	200	60	20	20	300
LANDIS	50	20	60	40	50	70	60	160	1,000	400	1,000	400	200	200	300	1,200
SUCCESS	0	10	0	0	0	0	0	10	100	30	40	20	20	5	5	10
FLEET VEHICLES	1,200	1,100	1,200	1,100	1,100	1,100	1,000	900	800	800	700	700	600	600	600	600
SUBTOTAL	**150,950**	**152,800**	**170,530**	**184,770**	**194,330**	**191,860**	**201,600**	**198,020**	**206,800**	**204,630**	**195,940**	**202,320**	**205,080**	**202,125**	**204,525**	**206,110**
TOTAL CO_2e	**3,200**	**3,200**	**3,600**	**3,900**	**4,100**	**4,000**	**4,200**	**4,200**	**4,300**	**4,300**	**4,100**	**4,200**	**4,300**	**4,200**	**4,300**	**4,300**

Nitrous oxide (N_2O) emissions in kg																
BOUNDARY DAM	379,000	395,000	439,000	401,000	432,000	464,000	477,000	477,000	494,480	496,100	500,500	506,300	508,400	480,300	499,700	502,800
POPLAR RIVER	428,000	429,000	426,000	455,000	459,000	419,000	461,000	425,000	422,100	406,300	390,300	409,600	420,100	418,600	413,700	400,000
ESTEVAN	21,700	13,700	3,900													
SHAND			64,500	157,900	172,600	158,700	175,200	181,000	173,200	183,500	155,800	168,900	168,300	172,600	170,200	170,300
QUEEN ELIZABETH	2,100	2,200	5,100	3,100	10,000	11,900	2,400	7,100	8,900	8,200	5,600	6,300	7,700	9,900	10,200	13,200
MEADOW LAKE	150	440	930	400	400	780	620	820	2,000	1,200	800	200	90	30	30	400
LANDIS	290	100	310	220	260	380	350	900	1,400	600	1,300	500	200	200	400	1,600
SUCCESS	10	60	20	20	20	10	10	40	120	50	60	30	20	5	5	10
FLEET VEHICLES	1,000	1,000	1,000	1,000	1,000	1,000	900	800	700	700	700	700	600	600	600	600
SUBTOTAL	**832,250**	**841,500**	**940,760**	**1,018,640**	**1,075,280**	**1,055,770**	**1,117,480**	**1,092,660**	**1,102,900**	**1,095,650**	**1,055,060**	**1,092,530**	**1,105,410**	**1,082,235**	**1,094,835**	**1,088,910**
TOTAL CO_2 e (t)	**258,000**	**260,900**	**291,600**	**315,800**	**333,300**	**327,300**	**346,400**	**338,700**	**341,900**	**340,000**	**327,100**	**338,700**	**342,700**	**335,500**	**339,400**	**337,600**

Total CO_2 e (t)																
	10,608,900	**10,754,900**	**12,299,300**	**13,159,900**	**13,906,800**	**13,801,200**	**14,410,400**	**14,481,500**	**14,821,400**	**14,654,100**	**13,998,000**	**14,428,200**	**14,644,100**	**14,453,200**	**14,654,100**	**14,855,000**

Greenhouse gases are expressed as an equivalent amount of CO_2 based on their global warming potential: CO_2=1, CH_4=21, N_2O=310.

GLOSSARY

Carbon dioxide equivalent (CO_2e)

A single unit of measurement used to calculate the impact of the various gases involved in global warming.

Cogeneration

The simultaneous generation of electricity and useful heat or steam.

Credit for early action

A system to credit verifiable early action prior to the first Kyoto Protocol commitment period as a further incentive to reduce GHG emissions.

Demand-side management (DSM)

Actions taken by a utility or other agency intended to influence the amount or timing of a customer's use of electricity.

Flyash

Residue left over when a fossil fuel such as coal is burned in a furnace.

Greenhouse gases (GHG)

Naturally-occurring gases such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) that trap heat in the earth's lower atmosphere.

Kilowatt hour (kW.h)

A unit of bulk energy. When a 100-watt bulb burns for 10 hours, it consumes one kilowatt-hour of energy.

Kyoto Protocol

An agreement reached in December 1997 that sets legally binding targets for GHG emission reductions. Canada has agreed to reductions 6% below 1990 emissions levels by 2008-2012. The protocol will not take effect until 55 countries representing at least 55% of developed countries' emissions have ratified it.

Line losses

Loss of energy in the power system due to resistance in the transmission and distribution wires.

Megawatt (MW)

A unit of bulk power, equals 1,000 kilowatts or 1 million watts. A watt is a unit for measuring electric power.

Offsets

Mitigation of greenhouse gas emissions outside our normal operations.

Sequestration

The enhanced removal and storage of carbon from the atmosphere through biological processes.

Tonne (t)

Equals 1,000 kilograms.